The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 25

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte FUNGAU HO and VIVEK JULKA

Appeal No. 2002-0404
Application No. 08/859,143

ON BRIEF

Before WALTZ, DELMENDO, and PAWLIKOWSKI, Administrative Patent Judges.

DELMENDO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1 through 17, which are all of the claims pending in the above-identified application.

The subject matter on appeal relates to: (i) a process for refining a butyl acrylate-containing stream comprising butyl acrylate, dibutyl ether, butyl acetate, heavies, and butanol (claims 1-5); (ii) a process for refining an acrylate-containing stream comprising ether, acetate, heavies, and alcohol (claim 6); (iii) a process for the production of butyl acrylate

(claims 7-10); and (iv) at least ten thousand pounds (avoir) of a butyl acrylate product (claims 11-17). Further details of this appealed subject matter are recited in representative claims 1, 6, 7, and 11, the only independent claims on appeal, reproduced below:

> 1. A process for refining a butyl acrylate-containing stream comprising butyl acrylate, dibutyl ether, butyl acetate, heavies and butanol, the process comprising the steps of:
>
> a. introducing said stream into a splitter distillation column to provide an overhead fraction comprising dibutyl ether, butyl acetate, butyl acrylate and butanol and a bottoms fraction comprising butyl acrylate and heavies;
>
> b. withdrawing from the splitter distillation column the bottoms fraction; and
>
> c. separating heavies from said bottom fraction by introducing the bottoms fraction into a butyl acrylate distillation column to provide an overhead product containing butyl acrylate and a bottom product containing heavies.
>
> 6. A process for refining an acrylate containing stream comprising ether, acetate, heavies and alcohol, the process comprising the steps of:
>
> a. introducing said stream into a splitter distillation column to provide an overhead fraction comprising ether, acetate, acrylate and alcohol and a bottoms fraction comprising acrylate and heavies;
>
> b. withdrawing from the splitter distillation column the bottoms fraction; and
>
> c. separating heavies from said bottom fraction by introducing the bottoms fraction into an acrylate distillation column to provide an overhead product containing acrylate and a bottom product containing heavies.
>
> 7. A process for the production of butyl acrylate, comprising the steps of:
>
> a. reacting in at least one reaction zone an

acrylic acid-containing feedstock with a butanol-containing feedstock to produce a butyl acrylate-containing product stream comprising butyl acrylate, dibutyl ether, butyl acetate, heavies and butanol;

b. introducing said product stream into a splitter distillation column to provide an overhead fraction comprising dibutyl ether, butyl acetate, butyl acrylate and butanol and a bottoms fraction comprising butyl acrylate and heavies;

c. withdrawing from the splitter distillation column the bottoms fraction;

d. separating heavies from said bottom fraction by introducing the bottoms fraction into a butyl acrylate distillation column to provide an overhead product containing butyl acrylate and a bottom product containing heavies;

e. withdrawing from the splitter distillation column the overhead fraction; and

f. introducing the overhead fraction into a butanol recovery distillation column to provide an overhead stream comprising dibutyl ether and butyl acetate and a bottoms stream comprising butanol;

g. withdrawing from the butanol recovery distillation column the bottoms stream; and

h. supplying at least a portion of the bottom stream to said at least one reaction zone.

11. At least ten thousand pounds (avoir) of a butyl acrylate product comprising at least 99.8wt% butyl acrylate and containing not more than about 200 ppm butyl ether and not more than about 200 ppm butyl acetate.

The examiner relies on the following prior art references as evidence of unpatentability:

Erpenbach et al. (Erpenbach)	4,280,010	Jul. 21, 1981
Dougherty et al. (Dougherty)	4,814,493	Mar. 21, 1989

Aldrich: Catalog Handbook of Fine Chemicals 256 (Date Uncertain)(Aldrich).

Claims 1 through 17 on appeal stand rejected under 35 U.S.C. § 103(a) as unpatentable over Dougherty in view of Erpenbach. (Examiner's answer of May 4, 2001, paper 21, pages 3-5.) Also, claims 11 through 17 on appeal stand rejected under 35 U.S.C. § 103(a) as unpatentable over Erpenbach. (Id. at page 5.) Further, claims 11 through 17 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Aldrich.[1] (Id.)

We reverse each of the aforementioned rejections.

Claims 1-17: Dougherty and Erpenbach

Dougherty describes a process for producing butyl acrylate from butanol and acrylic acid comprising: reacting butanol and acrylic acid in the presence of an esterification catalyst in reactor 10; removing the butyl acrylate reaction product from the reactor through line 15 and introducing the butyl acrylate reaction product into a finishing distillation tower 24; removing the bottom reactor residue containing polymer, butyl acrylate, butanol, and water from reactor 10 through line 14 and introducing the residue to a heat treater 16 to recover reaction products, which are then returned to reactor 10 via line 17; removing a slip stream from the heat treater 16 through line 18 to a heavy ends removal unit 19, where the residue is "sourced"

[1] Appellants do not contest that Aldrich is available as prior art.

from the system through line 20 and most of the volatiles are recycled to reactor 10 through line 21; sending a small portion of the butyl acrylate reaction product from line 15 to a butanol recovery unit 27 through line 23, where the volatiles are sent back to reactor 10 through line 28 and the residues are removed via line 30; recycling a portion of the highly volatiles of the finishing distillation tower to line 15 and sending the remainder to the butanol recovery unit through line 26; and recycling the residues of the finishing distillation tower to reactor 10. (Column 1, line 59 to column 2, line 65.)

Erpenbach is cited for its teaching of a high purity (99.9%) butyl acrylate product free from butyl ether. (Answer, pages 6-7.) We note, however, that the examiner fails to explain how the teachings of Erpenbach should be combined with the teachings of Dougherty.

With regard to the process claims, the examiner characterizes the difference between the invention recited in the appealed claims and Dougherty as follows (answer, page 4):

> The difference between the applicants [sic] claimed invention and the Dougherty et al. reference is that the reference uses a finishing distillation tower, instead of a splitter distillation column in conjunction with an acrylate distillation column, to carry out the separation of the overhead fraction from the acrylate product/residues and in turn the residues from the acrylate product (see reference drawing).

Nevertheless, the examiner held that the differences between the claimed invention and the prior art are "of no significance" and that the subject matter of the appealed claims would have been prima facie obvious to one of ordinary skill in the art "because Dougherty et al. teach that C_1-C_8 alkyl acrylates can be refined using the same material distillation refining process." (Id. at pages 4-5.)

With regard to the product claims, the examiner admits that Dougherty does not describe the purity levels as recited in appealed claim 11. (Id. at page 4.) It is the examiner's position, however, that one of ordinary skill in the art "would have expected the final product of Dougherty et al. to have a similar purity as the product of the presently claimed invention." (Id. at page 4.)

We disagree with the examiner's analysis and conclusion. Contrary to the examiner's allegation, the differences between the processes recited in the appealed claims and Dougherty's process are significant.[2] Despite these significant differences, the examiner does not identify any teaching, motivation, or suggestion in the prior art that would have led one of ordinary

[2] Because the differences are significant, there is no expectation that the products resulting from the prior art process and the claimed process would be similar in terms of purity.

skill in the art to modify Dougherty's process in the manner as proposed in the answer. In re Rouffet, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998) ("[T]he Board must explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious."); In re Dembiczak, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) ("[T]he best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references.").

Accordingly, we hold that the examiner has failed to establish a prima facie case of obviousness within the meaning of 35 U.S.C. § 103. In re Piasecki, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984).

Claims 11-17: Erpenbach or Aldrich

The examiner points out that Erpenbach and Aldrich both teach high purity butyl acrylate products. (Answer, page 5.) The examiner admits, however, that Erpenbach is silent regarding butyl acetate purity and that Aldrich does not teach the recited butyl acetate and/or butyl acetate purity levels. (Id.) Nevertheless, the examiner states: "[I]t is reasonable to conclude that the butyl acrylate product disclosed by the

Erpenbach et al. and the Aldrich references is just as pure or even more pure than Appellants' claimed butyl acrylate product since both references disclose a purity greater than 99.8%." (Id. at pages 8-9.)

The examiner's position is without merit, because the examiner has not identified any evidence or reasoning to establish that a butyl acrylate product having a purity greater than 99.8% will necessarily or inherently have the recited butyl ether/butyl acetate purity levels. In this regard, it is well settled that inherency cannot be established by mere possibilities or probabilities. MEHL/Biophile Int'l Corp. v. Milgraum, 192 F.3d 1362, 1365, 52 USPQ2d 1303, 1305 (Fed. Cir. 1999); In re Oelrich, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981); Hansgirg v. Kemmer, 102 F.2d 212, 214, 40 USPQ 665, 667 (CCPA 1939).

Summary

In summary, our disposition of this appeal is as follows:

the rejection under 35 U.S.C. § 103(a) of claims 1 through 17 as unpatentable over Dougherty in view of Erpenbach is reversed;

the rejection under 35 U.S.C. § 103(a) of claims 11 through 17 as unpatentable over Aldrich is reversed.

The decision of the examiner to reject the appealed claims over the applied prior art is reversed.

REVERSED

Thomas A. Waltz Administrative Patent Judge	)	
Romulo H. Delmendo Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
Beverly A. Pawlikowski Administrative Patent Judge	)	

rhd/vsh

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